

SECTION I—CLAIMS

Amendment to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application. Claims 1 and 36-37 are amended herein. Claims 2-28 and 34 are, or remain, canceled herein without prejudice. New claims 38-50 are presented herein.

Listing of Claims:

1. (Currently amended) A method comprising:

receiving content for transmission over a multicarrier communication channel having N_c subcarriers, the transmission to be made via a plurality of three or more transmit antennae, the number of transmit antenna being M and the received content being vectors of input symbols of size $N_c \times 1$;

generating a rate-one, space-frequency code matrix from the received content for the transmission via the plurality of transmit antennae to a plurality of receive antennae, wherein generating the rate-one space frequency code matrix comprises:

dividing a vector of input symbols into G groups of vectors,

multiplying each of the G groups by a constellation rotation pre-coder to produce a number G of pre-coded vectors,

dividing each of the pre-coded vectors into groups of subvectors, and utilizing the subvectors to generate a diagonal matrix, ~~and~~

interleaving ~~the~~ submatrices from the G groups to generate a rate-one space-frequency matrix of size $M \times N_c$, wherein interleaving the submatrices from the G groups to generate a rate-

one space-frequency matrix comprises generating a code word comprising a matrix of size $M \times N_c$ such that successive symbols in the same group are equi-spaced in the codeword; and

transmitting the rate-one space-frequency matrix via the plurality of transmit antennae.

2-28. (Cancelled)

29. (Previously presented) The method of claim 1, wherein the transmission provides full space-frequency diversity of $M \times N \times L$, where N is a number of receiver antennae.

30. (Previously presented) The method of claim 1, wherein dividing the vector of input symbols into G groups comprises:

dividing the vector of input symbols into G groups of $(ML) \times 1$ vectors, wherein L is a number of matrix channel taps and wherein $N_c = M \times L \times G$,

31. (Previously presented) The method of claim 1, wherein the input symbols are QAM (quadrature amplitude modulation) symbols.

32. (Previously presented) The method of claim 1, wherein the same constellation-rotation pre-coder is applied to each of the $N_c \times 1$ vector of input symbols by left-multiplying the vector by the constellation rotation, and wherein the constellation rotation is of dimension $ML \times ML$ to produce a size ML vector.

33. (Previously presented) The method of claim 1, wherein dividing each of the pre-coded vectors into groups of subvectors comprises:

dividing each of the pre-coded vectors into L groups of $M \times 1$ subvectors, and utilizing the subvectors to generate an $M \times M$ diagonal matrix.

34. (Cancelled).

35. (Previously presented) The method of claim 1, further comprising encoding the content using

a modulation technique.

36. (Currently amended) The method of claim 1, wherein for the rate-one, space-frequency code matrix ~~successive~~ ~~successive~~ symbols from the same group that are transmitted from the same antenna of the plurality of antennae are at a frequency distance that is multiples of MG subcarrier spacings.

37. (Currently amended) The method of claim 36, wherein the L symbols from the same group transmitted from the same antenna ~~experience~~ ~~experience~~ uncorrelated fading.

38. (New) A machine readable storage medium having instructions stored thereon that, when executed by a processor, cause the instructions to perform a method comprising:
receiving content for transmission over a multicarrier communication channel having N_c subcarriers, the transmission to be made via a plurality of three or more transmit antennae, the number of transmit antenna being M and the received content being vectors of input symbols of size $N_c \times 1$;
generating a rate-one, space-frequency code matrix from the received content for the transmission via the plurality of transmit antennae to a plurality of receive antennae, wherein generating the rate-one space frequency code matrix comprises:
dividing a vector of input symbols into G groups of vectors,
multiplying each of the G groups by a constellation rotation pre-coder to produce a number G of pre-coded vectors, wherein the same constellation-rotation pre-coder is applied to each of the $N_c \times 1$ vector of input symbols by left-multiplying the vector by the constellation rotation, and wherein the constellation rotation is of dimension $ML \times ML$ to produce a size ML vector,
dividing each of the pre-coded vectors into groups of subvectors, and utilizing the subvectors to

- generate a diagonal matrix,
- interleaving submatrices from the G groups to generate a rate-one space-frequency matrix of size $M \times N_c$; and
- transmitting the rate-one space-frequency matrix via the plurality of transmit antennae.
39. (New) The machine readable storage medium of claim 38, wherein the transmission provides full space-frequency diversity of $M \times N \times L$, where N is a number of receiver antennae.
40. (New) The machine readable storage medium of claim 38, wherein dividing the vector of input symbols into G groups comprises:
- dividing the vector of input symbols into G groups of $(ML) \times 1$ vectors, wherein L is a number of matrix channel taps and wherein $N_c = M \times L \times G$,
41. (New) The machine readable storage medium of claim 38, wherein the input symbols are QAM (quadrature amplitude modulation) symbols.
42. (New) The machine readable storage medium of claim 38, wherein dividing each of the pre-coded vectors into groups of subvectors comprises:
- dividing each of the pre-coded vectors into L groups of $M \times 1$ subvectors, and utilizing the subvectors to generate an $M \times M$ diagonal matrix.
43. (New) The machine readable storage medium of claim 38, wherein interleaving the submatrices from the G groups to generate a rate-one space-frequency matrix comprises generating a code word comprising a matrix of size $M \times N_c$ such that successive symbols in the same group are equi-spaced in the codeword.
44. (New) The machine readable storage medium of claim 38, wherein the method further comprises encoding the content using a modulation technique.
45. (New) The machine readable storage medium of claim 38, wherein for the rate-one, space-

frequency code matrix successive symbols from the same group that are transmitted from the same antenna of the plurality of antennae are at a frequency distance that is multiples of MG subcarrier spacings.

46. (New) The machine readable storage medium of claim 45, wherein the L symbols from the same group transmitted from the same antenna experience uncorrelated fading.

47. (New) A radio system comprising a plurality of transmit antennae, a plurality of receive antennae, and logic circuitry to cooperatively implement a method comprising:

receiving content for transmission over a multicarrier communication channel having N_c subcarriers, the transmission to be made via three or more of the plurality of transmit antennae, the number of transmit antenna being M and the received content being vectors of input symbols of size $N_c \times 1$;

generating a rate-one, space-frequency code matrix from the received content for the transmission via the three or more transmit antennae to the plurality of receive antennae, wherein generating the rate-one space frequency code matrix comprises:

dividing a vector of input symbols into G groups of vectors,

multiplying each of the G groups by a constellation rotation pre-coder to produce a number G of pre-coded vectors,

dividing each of the pre-coded vectors into groups of subvectors, and utilizing the subvectors to generate a diagonal matrix,

interleaving submatrices from the G groups to generate a rate-one space-frequency matrix of size $M \times N_c$; and

transmitting the rate-one space-frequency matrix via the three or more transmit antennae,

wherein for the rate-one, space-frequency code matrix, successive symbols from the same

group that are transmitted from the same antenna of the plurality of antennae are at a frequency distance that is multiples of MG subcarrier spacings.

48. (New) The radio system of claim 47, wherein the L symbols from the same group transmitted from the same antenna experience uncorrelated fading.
49. (New) The radio system of claim 47, wherein the same constellation-rotation pre-coder is applied to each of the $N_c \times 1$ vector of input symbols by left-multiplying the vector by the constellation rotation, and wherein the constellation rotation is of dimension $ML \times ML$ to produce a size ML vector.
50. (New) The radio system of claim 47, wherein interleaving the submatrices from the G groups to generate a rate-one space-frequency matrix comprises generating a code word comprising a matrix of size $M \times N_c$ such that successive symbols in the same group are equi-spaced in the codeword.